

Appendix D

Differential Reinforcement Example

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Managing Behavior Problems: Accentuate the Positive... Eliminate the Negative!

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A former student called me yesterday.

"I need help. I'm teaching math to sixth, seventh, and eighth graders in a resource room, and my class is out of control. I've got Michael, Selina, Ryan, and Chris--All known for causing trouble--plus five others in this class. Everyone feels sorry for me. I thought teaching was supposed to be fun."

"What have you done with your applied behavioral analysis textbook?" I asked with amusement.

"I sold it," she said, sighing.

"OK" I said in my best professional voice. "Tell me what's going on."

"I've tried sending them to the office, calling their parents, giving them detention, and making them sit in the hall. Nothing seems to work. The principal and the parents just scold them and the kids are just as disruptive the next day. One of them called me a mean, mean teacher yesterday... and I feel like one."

As teachers try to maintain control in their classrooms, they often react initially by punishing undesired behavior (Morgan & Jenson, 1988). Teachers prefer punishment as a means to reduce undesirable behavior because they are reinforced by the immediate nature of its effects (Alberto & Troutman, 1986).

However, punishment often fails to create attentive, quiet, compliant students. By definition, it does not teach desirable behavior. Scolding, ridicule, lowering of a grade, loss of privileges, temporary removal from class, suspension, or corporal punishment

will not guarantee that a student will come to class on time, bring the necessary materials, or begin doing satisfactory schoolwork.

One reason for this failure might be that too often teachers *only* focus on reducing the inappropriate student behavior rather than actively teaching and reinforcing appropriate behavior (Winett & Winkler, 1972). They concentrate on what the student is *not* to do, as opposed to emphasizing which desired behaviors they want the student to exhibit instead.

To remedy this requires a shift in the traditional mindset: Rather than concentrating on the undesired behavior, the teacher should look for a positive alternative that will result in reinforcement for the student. This involves deciding what the student needs to do that she is not doing at the moment, then teaching it and reinforcing it. This positive approach to reducing misbehavior is an easy and effective strategy known as *differential reinforcement* or *positive reductive procedures* (Deitz & Repp, 1983). Differential reinforcement, in this context, means that positive behaviors receive reinforcement. The behavior targeted for reduction is not directly addressed. The result is an increase in more appropriate alternative behaviors and a decrease in the undesired behavior. It is an instructionally sound technique and has been used successfully in clinics and classrooms to reduce a variety of behaviors such as aggressive behavior (Knapczyk, 1998; Poling & Ryan, 1982); out-of-seat behavior and talking (Ayllon & Roberts, 1974); in-class sleeping, talk-outs, and disruptions (Allen, Gottselig, & Boylan, 1982; Deitz, Repp, & Deitz, 1976); inappropriate speech (Barton, 1970); and hyperactivity (Patterson, 1965; Twardosz & Sajwaj, 1972).

"I'm sorry you feel like a mean teacher. Punishment has a way of putting you in that role. Tell me about your reinforcement program."

"I let students work on the computer or have free time if they finish their work, and if everyone is cooperative all week, we have popcorn on Friday."

"Technically, you are using differential reinforcement, which is an effective technique, but you need to 'fine tune' this system so it will work for you. Tell me more about Michael."

"He's a bully. He's big and loud and is always picking fights with the other kids. He was in four fights today!"

"Why don't you try a DRO technique with him?"

"DRO?"

Differential Reinforcement of Zero Rates of Behaviors (DRO)

DRO means that the student is reinforced for periods of time during which no inappropriate behavior is displayed. For example, if the goal is to reduce fighting, the student may be reinforced for every hour that he or she is not in a fight. Or, if the goal is to reduce cursing in the classroom, the teacher may reinforce the student for every 10 minutes of refraining from cursing. The frequency of the inappropriate behavior before the treatment intervention begins will determine the initial criterion for reinforcement. (During baseline, the teacher counts how much time elapses between instances of the target behavior, the average of all these times becomes the initial criterion.) The time intervals with "zero undesired behavior" will gradually be increased until the student's behavior approximates that of an average peer in a regular classroom setting. For example, the teacher said Michael fights on an average of three times per 6-hour school day. Therefore, he might be reinforced for every 2 hours (6 divided by 3) that he does not fight. At the end of each 2-hour segment that he does not fight, Michael can

give himself a point on his point card. His points can be turned in daily or weekly for classroom rewards.

When using differential reinforcement, it is usually recommended that any instances of the targeted inappropriate behavior be ignored. However, this is not always possible with severe behaviors such as fighting. Punishment for the inappropriate behavior may be necessary if the behavior is dangerous or if it is one that spreads quickly to other students (e.g., running in the school, horseplay, or calling out). However, the teacher should try a DRO procedure before considering punishment. DRO can work well with verbal aggression (e.g., name calling, threats), talking back, destruction of property, and tantrums.

"Well, I can see how DRO might work for Michael, but I don't see how it would work for Ryan. He refuses to do anything that I ask him to do. He doesn't work, doesn't pay attention, doesn't look at me, and doesn't answer my questions. He's already doing zero behavior--good behavior, that is."

"Why don't you try DRI with Ryan?"

"I feel like I'm taking one of your tests! What's DRI?"

Differential Reinforcement of Incompatible Behaviors (DRI)

With this strategy, the teacher reinforces a specific student behavior (e.g., following directions) that is impossible for the student to perform at the same time as the behavior targeted for reduction (e.g., noncompliance). For instance, if a teacher wishes to reduce name-calling behavior, then calling people by their appropriate names would be systematically reinforced. The student cannot both call people by their appropriate names and name call at the same time. Thus, as calling people by their correct names increases in frequency, name-calling behavior automatically becomes less frequent. As

another example, if a teacher wishes to reduce talking, it would be wise to heavily reinforce instances when the student's mouth is closed. The two behaviors (mouth closed and talking) are incompatible.

The behaviors chosen (the one targeted for reduction and the alternate behavior) should cover 90% to 100% of the possible alternative behaviors (Donnellan, LaVigna, Negri-Shoultz, & Fassbender, 1988). This means that the child will have no other choices for behavior. For example, the child is either off task, quiet or talking, in seat or out of seat, on task. There are few other choices. It would not work well to reinforce "hands-to-self" behavior in order to decrease off-task behavior. The student can keep hands to self and sleep, which would be off task, and still be eligible for reinforcement. Likewise, it would not work well to reinforce task completion to decrease noncompliance. The student could finish the task but not follow the teacher's directions in doing so (noncompliance), the task could be handed in late or done in pencil instead of pen. The student would still be eligible for reinforcement even though the noncompliance was not reduced. If the student can be doing what is asked while still engaging in the undesirable behavior, another incompatible behavior should be chosen for reinforcement. Table 1 provides some examples of appropriate incompatible behaviors.

Table 1

Positive Incompatible Alternatives for Common Classroom Behavior Problems

UNDESIRE D BEHAVIOR

POSITIVE INCOMPATIBLE ALTERNATIVE

Talking back

Positive response such as "Yes Sir" or "OK" or "I understand"; or acceptable questions such as "May I ask you a question about that?" or "May I tell you my side?"

Cursing	Acceptable exclamations such as "Darn," "Shucks."
Being off-task	Any on-task behavior: looking at book, writing, looking at teacher, etc.
Being out of seat	Sitting in seat (bottom on chair, with body in upright position).
Noncompliance	Following directions within ____ seconds (time limit will depend upon age of student); following directions by second time direction is given.
Talking out	Raising hand and waiting to be called on.
Turning in messy papers	No marks other than answers; no more than ____ erasures; no more than three folds or creases.
Hitting, pinching, kicking, pushing/shoving	Using verbal expression of anger; pounding fist into hand; sitting or standing next to other students without touching them.
Tardiness	Being in seat when bell rings (or by desired time).
Self-injurious or self-stimulatory behaviors	Sitting with hands on desk or in lap; hands not touching any part of body; head up and not touching anything (desk, shoulder, etc.)
Inappropriate use of materials	Holding/using materials appropriately (e.g., writing only on appropriate paper, etc.)

"Oh, I see... I can reinforce Ryan for following directions and probably reduce his refusal to do what I say. Maybe I can use a point system with Ryan, also, where he gets a point for every direction that he follows. I think I may need to prompt Ryan at first so he will know when I'm giving a direction. I think this might work!"

"Let's talk about what we can do about Selina," I said, encouraged.

"Selina wants to dominate the class and shout out things when others are trying to talk. Her comments are often off task, and it really disrupts interactions."

"Well, you could use DRO or DRI, but it sounds like a habit and it might be easier for Selina to reduce the behavior gradually, rather than all at once."

"Let me guess--another differential reinforcement procedure?"

Differential Reinforcement of Lower Rates of Behavior (DRL)

For behaviors that do not need to be reduced quickly or reduced to zero occurrence (e.g., calling out for help), or for behaviors that are strong habits (e.g., talk-outs, burping, teeth grinding, self-stimulation), DRL may be the technique of choice. A teacher using this strategy would reinforce progressively lower rates of a behavior. For instance, if a teacher can tolerate some call-outs, then she can reinforce the student for progressively reducing the number of times that she calls out without permission. Or if a teacher wants to reduce teeth grinding, but does not need this to change immediately, he could reinforce the student for grinding his teeth no more than four times during a specific time period. When the student is successful at this level, reinforcement would next be contingent upon grinding teeth no more than three times. This criterion would gradually be lowered until the behavior is at an acceptable level.

The initial criterion for reinforcement is set by determining the average frequency or duration of the behavior before starting the procedure. If a student talks out on an average of four times per period, then setting the initial reinforcement criterion at four or less would be appropriate. The criterion for reinforcement is gradually lowered by reasonable intervals until an acceptable level of behavior is achieved. By allowing the student to change a habitual behavior gradually, rather than expecting immediate

cessation, DRL helps ensure success as the student progresses toward the target level. Dangerous behaviors or contagious behaviors would not be appropriate for reduction with a DRL technique.

"Well, I can see that I could individualize my point system for each student. I could let Selina earn a point for every hour that she has fewer than eight call-outs. If she is successful this week, then next week it will have to be fewer than six call-outs until she has an average of only one call-out per hour. But what about Chris? He's a different one. He acts very immature, and anytime something does not go his way he cries and whines and stomps around the room. Even though the other kids make fun of him, he continues the behavior."

"You could use DRO, but it sounds like he needs to learn how to express his frustration. There is another technique that might work for him called DRC."

Differential Reinforcement of Communicative Behaviors (DRC)

Recent literature (Sasso & Riemers, 1988) has proposed that some students may be acting inappropriately in order to communicate something. An analysis of aggressive and noncompliant behavior may reveal that the student is simply attempting to say, "Stop, I don't want to do it," or "I don't like you," or "I don't know the answer," or "I'm frustrated." Many students have not learned how to say these things directly. If this is the case, then teaching an appropriate alternative method for the student to communicate those thoughts and feelings will result in a reduction of the aggressive and noncompliant behavior.

The teacher's task is to analyze the student's inappropriate behavior and attempt to find communicative intent in it. If the teacher suspects communicative intent, then an appropriate communication strategy needs to be determined. For example, how should

students communicate anger? Students with good language skills may learn to write about the anger or say "Being pushed makes me angry." Lower-functioning students may need to draw a picture of the emotion or use words or sign language. If the teacher demonstrates an alternative style of communication and heavily reinforces the student when appropriate communication is used, aggressive and noncompliant behaviors that have communicative intent should be reduced.

"So I could give Chris a point each time he says "I'm frustrated" with no crying, whining, or stomping. Maybe I could also give him points for each day that he has zero tantrums. That's DRO isn't it?"

"Yes, good! You can combine any of these techniques to make a more powerful intervention. By George, I think you've got it!"

Advantages of Differential Reinforcement

Differential reinforcement has many advantages. Among them are the following:

1. If the differential reinforcement system reduces the inappropriate behavior, the teacher can avoid punishment and its side effects. Most teachers are not effective punishers. They do not punish consistently, unemotionally, or contingently. Moreover, many students in special education have built up resistance to commonly available punishers such as scolding, being sent to the office, or corporal punishment. They require a much stronger punisher that may not be available to school personnel. Use of differential reinforcement can also help the teacher forestall the rage, avoidance, and anger reactions that often accompany the delivery of punishment.
2. Differential reinforcement is a powerful intervention strategy that will effectively reduce the majority of inappropriate behaviors without the concurrent use of

punishment. Punishment should be used only after differential reinforcement techniques alone have been found to be inadequate. This may be true in the case of aggressive, dangerous, destructive, self-injurious, or extremely disruptive behaviors which, because of their severity, need to be extinguished immediately.

3. Use of differential reinforcement will help ensure that the teacher is teaching prosocial behavior because the teacher must specify a positive goal, assess the student's current skill level relevant to that goal, provide direct instruction in deficient skill areas, and give the student feedback (e.g., reinforcement) regarding progress toward the goal.
4. Differential reinforcement can be conducted in a variety of settings by a variety of people, thus adding to effective generalization.
5. Differential reinforcement allows the teacher to display and demonstrate prosocial behavior (e.g., praising someone's efforts and giving rewards) as opposed to antisocial behavior (e.g., hurting someone).
6. Once a behavior is targeted for reinforcement, individualized education program (IEP) goals and objectives are easily written in positive terms.
7. Differential reinforcement tends to enhance the student-teacher relationship by setting up positive interactions between the target student and the teacher. It creates a situation in which the teacher delivers positive instead of (or in addition to) negative consequences.

Steps for Implementation

The following steps are recommended for classroom implementation.

Identify the behavior to be reduced or eliminated. This is generally the easiest step.

However, a word of caution: Do not try to change every undesired behavior that a

student exhibits. Start with the behavior this is most intolerable in the school setting or the behavior that is causing the most problems for the student.

Identify positive alternatives to the undesired behavior. What would you like for the student to do instead? Provide the student with an alternative behavior that can be reinforced. For example, if the student is talking out without permission, reinforce only when he or she raises a hand to speak; if the student is frequently aggressive, reinforce during the times when he or she is not aggressive. If a student calls out frequently provide reinforcement for calling out less often. If a student acts out feelings, model an appropriate way to communicate feelings.

Select a system of differential reinforcement. Use DRL for behaviors that can be reduced gradually; DRO for behaviors that need to be reduced to zero levels; DRI to teach a specific positive behavior as an alternative to the undesirable behavior; and DRC when the goal is to increase functional communication skills. Table 2 lists recommended differential reinforcement systems for common behavior problems.

Table 2

Positive Incompatible Alternatives for Common Classroom Behavior Problems

PROBLEM BEHAVIOR	DIFFERENTIAL REINFORCEMENT TECHNIQUE
Talking back	Reinforce each 15- or 30-minute or 1-hour period with no talking back (DRO). Or reinforce each time that the student responds to the teacher without talking back (DRI).
Causing property damage	For each day that no property is damaged, reinforce the student and/or the class (DRO)
Cursing	Reinforce each 15- or 30-minute or 1-hour period with no cursing (DRO). Reinforce use of appropriate adjectives and

	exclamations (DRC).
Being off task	Reinforce each 5-, 10-, 15-, or 30-minute period of continuous on-task behavior (DRI).
Failing to complete tasks	Reinforce each task that is completed, half completed, or started (DRI).
Tardiness	Reinforce each day or period that the student is on time (DRI).
Being out of seat	Reinforce 5-, 10-, 15-, or 30-minute periods of continuous in-seat behavior (DRI).
Fighting	Reinforce the student each time he or she interacts appropriately with another student (DRI). Or reinforce the student each hour that he or she does not tease, pinch, etc.(DRO).
Noncompliance	Reinforce the student for each direction that he or she follows with 5 seconds (DRI). The schedule can be thinned to every 3 directions followed, 8, 10, etc.
Talking out	Reinforce the student each time that he or she raises a hand and waits to be called on (DRI). Thin the schedule to 3, 5, 10 times, etc. Or reinforce progressively less talking out (DRL).

Set up a reinforcement system. Pick reinforcers appropriate for the student's age and grade level. The reinforcers can be tangible reinforcers of privileges. Use school-related (natural) reinforcers whenever possible. Social reinforcers (smiles, praise, etc.) should always be used in conjunction with other reinforcers so that other reinforcers can be faded eventually. Survey the students, watch them, or ask other teachers and parents for appropriate reinforcer ideas. Make a list of at least 10 possible reinforcers.

Token reinforcement systems are a convenient way to reinforce systematically in the classroom. Checkmarks, stars, stamps, stickers, or initials can be exchanged for the reinforcers on the list. Tokens make it possible to give heavy reinforcement initially without disrupting lessons and without the danger of satiation. For more information on token systems see Alberto and Troutman (1986); Ayllon and Azrin (1968); Kazdin (1977); Polloway and Polloway (1979); and Stainback, Payne, Stainback, and Payne (1973).

Set a success criterion. Determine the **final** criterion for the desired behavior. For example, how long must the student stay seated? How many tasks must the student complete each day? How long must the student display no teasing? The success criterion will vary according to the age and developmental level of the child, the setting in which the child must operate, and the behavior. One way to decide on a reasonable criterion is to determine how much or how long the same behavior is exhibited by an average student of the same age in a relevant setting. For example, if most students stay in their seats for an average of 40 minutes continuously, then do not stop the reinforcement strategy until this criterion is met by the student and the behavior is exhibited at this level over a substantial period of time. Be specific about setting a success criterion. It should not be decided haphazardly, but should be based on what the student needs to display to be successful in the mainstream setting. Begin by reinforcing small increments or short periods of time, and gradually lengthen these time periods or increase the amount of behavior required for reinforcement.

Evaluate results. Count both the inappropriate student behavior and the alternative behavior that had been reinforced. Simply saying that the student is acting "better" does not provide the information necessary for further planning. If either behavior is not progressing in the desired direction, check the intervention for problems.

Potential Problems

The following are possible reasons why the differential reinforcement system is not working. Check these items before and during your intervention.

1. The target behavior has not been specified or assessed well. Pick one behavior at first and count it. Also, analyze it for communicative intent.
2. The reinforcers are not as rewarding to the student and/or are less powerful than the reinforcers the student is receiving for inappropriate behavior (e.g., teacher or peer attention, avoiding tasks, etc.)
3. The reinforcers are not delivered often enough for the student to recognize the value of exhibiting the desired behavior, or they are delivered so often that they cause satiation.
4. The reinforcers are not delivered consistently and contingently. Do not just give reinforcers when you feel like it, or stop the strategy because it "takes too much time." If the strategy is working, do not stop it until the success criterion is met.
5. The alternate behavior is not one that is achievable by the student. If the student does not know how to perform the behavior, then it should be taught using direct instruction and prompting.
6. The reinforcement schedule is thinned too slowly. Fade prompts and thin the reinforcement schedule as the student is successful at each stage. The goal is to eventually get to the point where an intermittent schedule of naturally occurring reinforcers will maintain unprompted behavior.
7. Generalization of the behavior in other settings has not been specifically addressed. Generalization should be taught before instruction is stopped. (See Alberto & Troutman, 1986, or Morgan & Jenson, 1988, for methods of generalization training.)

8. Instruction in new, appropriate behaviors is not continued. When the student has mastered one new appropriate behavior, teach another one. In this way, the student's access to reinforcers is increased. Furthermore, as the student masters more appropriate behaviors, fewer inappropriate behaviors will be displayed.

Summary

Differential reinforcement is a positive, relatively easy, and effective method of reducing inappropriate behavior by reinforcing positive alternative to the undesired behavior. It requires a shift from concentration on what the student **needs to stop** to focusing on what the student **needs to do** instead. Differential reinforcement may be used alone, or, if necessary, in conjunction with punishment if the undesired behavior is extremely violent, dangerous, self-injurious, or destructive.

Differential reinforcement, like any other good behavior management system, places certain requirements on teachers if it is to work. The teacher must be consistent in delivering the reinforcers for the targeted desired behavior. It often is not easy to maintain this level of consistency, and it requires a high degree of commitment on the part of the teacher. However, the rewards resulting from this commitment are great. Time spent administering a system of differential reinforcement is probably less than that which is already being expended in dealing with inappropriate behavior, and the returns are far greater. It not only reduces inappropriate behavior, it teaches and reinforces appropriate behavior. Differential reinforcement is well worth the time and effort it involves.

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